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(54) Radiotelephone arrangement
with optical coupling

(57) A radiotelephone arrangement uses optical coupling between two discrete elements, specifically a handportable telephone (1) and a car fitting stand (2) or between a mobile handset and a radio unit. This coupling is resistant to continuous vibration, humidity and pollution. Also, the arrangement significantly reduces interference radiated from the telephone housing. A charging device (12) included in the fitting stand (2) may be coupled electrically to a battery 9 of the handportable telephone (1) and the charging device may be actuated by an optical signal (17) from the telephone. The optical coupling (13-17) may take place through free space or an optical cable.

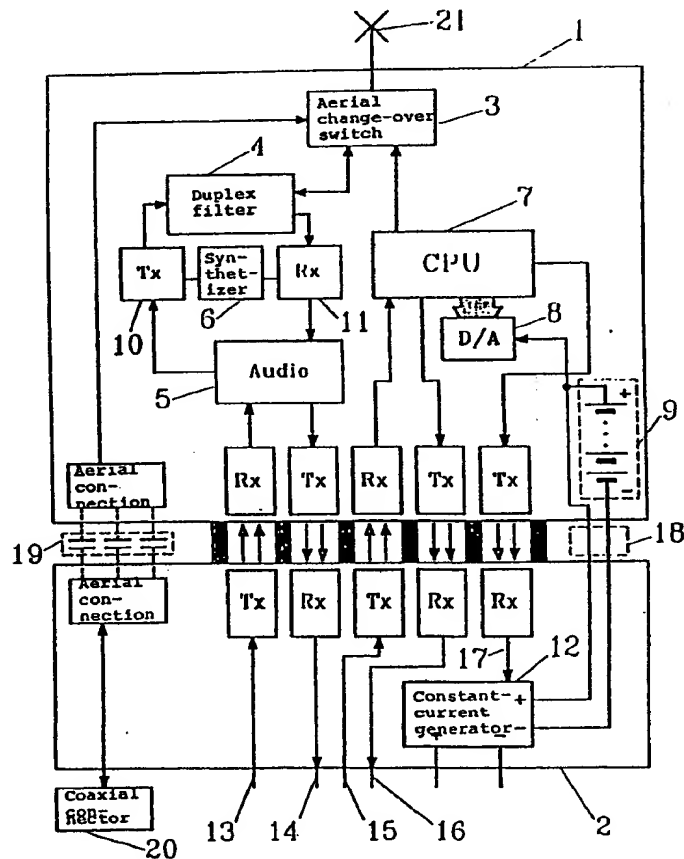


Fig. 1

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Radiotelephone arrangement with Optical Coupling

The invention relates to a method and apparatus for transferring signals between elements of a radiotelephone, for example between a portable telephone and an in-car interface unit or between a mobile telephone handset and a radio unit.

In the art of radiotelephones, it has been difficult to achieve a reliable electric connection of a handportable telephone to an in-car adaptor or interface unit. The currently used solutions implemented with electrical connectors are either too expensive or have a poor resistance to mechanical stress. The reliability of the connection is subject to relatively harsh conditions due to continuous vibration, humidity and pollution. Also, the requirements on the electromagnetic radiation emission of electric devices mounted in cars are becoming more rigid at present, as indicated for example by the German car manufacturers' association (VDA) requirements about -97 dBm radiation levels. The requirements are intended to ensure that electronic devices, such as mobile telephones, used in cars do not interfere with the anti-lock brake system (ABS), the counters, or any other electronic systems in the car.

Current transceiver units generally require special filters in order to comply with the rigid interference radiation standards for car manufacturers. With regard to radiating interference, the connectors of a telephone set housing cause the most serious problems. In fact, appropriate filters must usually be coupled to the connectors to suppress interference. These problems are likely to increase in the future because reliable connections are expensive and the smaller size and absence of a metal frame are inconsistent with efficient radiation filtering. The most serious problems occur especially in hand-held telephones,

radiating interference is attenuated and the coupling between the elements is less susceptible to vibration, humidity and pollution.

In one embodiment the invention is used in the context of connecting a handportable telephone to a car fitting stand. The handportable telephone and the fitting stand mechanics are implemented such that each connection point, equipped with an appropriate photoconductor, is able to transfer light information between the fitting stand and the handportable telephone unit and that a sufficient isolation is provided between the connection points. A charging device or some other peripheral device can also be connected to the handportable telephone.

In an alternative embodiment the invention is used in the context of connecting a mobile telephone handset and a radio unit.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawing in which:

Figure 1 is a schematic block diagram of a radiotelephone arrangement in accordance with the invention.

In Figure 1, a handportable telephone is marked with reference 1 and a car fitting/charging stand (i.e. interface unit) with reference 2. The handportable telephone member 1 comprises a transmitter circuit 10, a receiver circuit 11 and a synthesizer 6 between these two. The signal passes between the transmitter circuit 10 or the receiver circuit 11 and the handportable telephone aerial 21 via a duplex filter 4. The handportable telephone aerial 21 can be replaced by an external aerial by means of the aerial change-over switch 3. The aerial connection 19 between the

carried out galvanically.

The optics can be switched on in various manners. The positive poles of the battery cell system and the constant-current generator communicate with the central processor unit 7 via the D/A transformers 8. Thus, the handportable telephone 1 can identify the fitting stand 2 and switch on the optical connections 13-17. The fitting stand 2 can also be identified with the aid of a mechanical identification, for instance a plastic pin in the car fitting/charging stand. A programmed identification can also be used, the central unit 7 controlling the charge control button 17 and measuring the variation of the operating voltage.

In the optical connections 13-17, the light information passes directly between the units. Air or some other photoconductive material can be used as a photoconductor. The impact of the power consumption caused by the optics is avoided by feeding the device from its own battery. In this manner, the other light interference does not either affect the operation of the telephone as it is detached from the fitting stand and acts as a portable telephone.

The optical connections 13-17 are not affected by vibrations or humidity, as current galvanic connectors are. Problems caused by pollution are also less harmful than in currently used connectors. In the solution according to the invention, the connector needs no filtering, since no radiating interference arises.

The housing of the handportable telephone 1 and the housing of the fitting stand 2 may act as mechanics of the connector so that no separate mechanical solution is needed in the connector. The optical components of the connector can be composed in the circuit card at the same time as the other components. The optical

Claims

1. A method for transferring an electric signal between two elements of a radiotelephone, characterized in that, as the electric signal is being transferred from one element to another, the electric signal of the first element is first converted in the first element into an optical signal and the optical signal passes through the medium to the second element, after which the optical signal is reconverted in the second element into an electric signal of the second element.

2. A method according to claim 1, characterized in that the second element of the radiotelephone is a handportable telephone (1), which has connections for converting electric signals into optical signals and for converting optical signals into electric signals and the second element is a car fitting stand (2), which has connections for converting optical signals into electric signals and vice versa, the fitting stand further comprising arrangements for connecting to a peripheral device.

3. A method according to any of the preceding claims, characterized in that the light information is directly transferred between the handportable telephone (1) and the car fitting stand (2) by using air or some other photoconductive material as a photoconductor.

4. A method according to claim 3, characterized in that the mechanics of the handportable telephone (1) and the car fitting stand (2) are implemented so that each connection point, equipped with an appropriate photoconductor, can transfer the light information between the fitting stand (2) and the handportable telephone unit (1).

5. A method according to claim 4, characterized in that the current feed and charging (18) of the car

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Patents Act 1977
Examiner's report to the Comptroller under
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Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Search Examiner

MR M J JONES

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18 DECEMBER 1992

Documents considered relevant following a search in respect of claims 1-9

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB A 2237954 (IN-CAR SYSTEMS)	1, 3, 9
X	EP A2 0383277 (NOKIA)	1, 3, 9
X P	WO A1 92/10046 (LIGHT IDEAS) see especially Figure 10	1, 2, 3, 9
X	US 4291411 (BOSCH)	1, 2, 3, 9
X	DE A1 3402597 (PHILIPS)	1, 3, 9